A multi-resolutive extraction of geometric descriptors for virtual shapes and humans

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Tools for the automatic decomposition of a surface into shape features will facilitate and optimize the classification, matching, texturing, morphing, and simplification of 3D shapes. Different features, such as flats, limbs, tips, pits, and various blending shapes between them may be characterized in terms of local curvature and other differential properties of the surface, or in terms of a global skeletal organization of the volume it encloses. However, both solutions are extremely sensitive to small perturbations in the surface smoothness and to quantization effects when they operate on triangulated surfaces.

The paper presents a shape characterization based on a multi-resolutive curvature computation where the vertices of a given triangle mesh are classified according to their curvature and shape behavior in neighborhoods of increasing size, and whose final goal is to segment 3D models into main bodies and tubular parts, and to code the tube/body connectivity with their geometric parameters

Last, we propose to apply the morphological analysis for the automatically extraction of the semantic of human body models for their representation, retrieval and applications to animation. We prove the efficacy of our tool in automatically extracting morphological shape parameters and locating feature points on the human body identifying fingertips, nose,armpits, ankles, umbilicus, and so on.